

Union Pacific Railroad.

REPORT

OF

G. M. DODGE, CHIEF ENGINEER,

TO

THE BOARD OF DIRECTORS,

ON A

**BRANCH RAILROAD LINE FROM THE UNION PACIFIC RAILROAD TO
IDAHO, MONTANA, OREGON, AND PUGET'S SOUND.**

WASHINGTON, D. C.
PHILP & SOLOMONS.
1868.



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UPRR MAP
SHOWING LINE OF BRANCHES
FROM U.P.R.R. PORTLAND OREGON.
PUGET SOUND WASH. TERR. MONTANA.

TO ACCOMPANY REPORT OF
G.M. DODGE
Chief Eng.
1888



Graft

The Newberry
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of Western Am

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UNION PACIFIC RAILROAD.

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UNION PACIFIC RAILROAD.

OFFICE CHIEF ENGINEER U. P. R. R.,
OMAHA, *December 1, 1867.*

Hon. OLIVER AMES, *President U. P. R. R.,*
20 Nassau street, New York :

DEAR SIR: In accordance with the instructions of the Board of Directors, forwarded to me at Salt Lake City, I have the honor of submitting the following report upon railroad lines from the Union Pacific Railroad to Montana, Idaho, Portland, (Oregon,) and Puget's Sound, (Washington Territory,) known as the Idaho and Oregon branch. I shall report upon the line in two divisions, viz :

First, The approaches to Snake river valley, from the line of the Union Pacific Railroad, between Green river and Salt Lake City.

Second, The route from Snake river valley to Portland, Oregon, and Puget's Sound, Washington Territory. I also include the branch to Montana.

APPROACHES TO SNAKE RIVER VALLEY.

First. The route marked "A" on the map leaves the U. P. R. R. line in the Black Forks of Green river, near the mouth of Ham's Fork of Black's Fork; follows up Ham's Fork to Hodges's Pass, through the rim of the Great Salt Lake basin; then descends to Bear river valley, which it follows to the northerly bend of Bear river, latitude $42^{\circ} 30'$, some eight miles north of Soda Springs; then leaves the valley in a N. 45 W. course, passing through the broad, open plain known as the Port Neuf gap—this plain, from Bear river valley, being nearly level, without any difficult summits

to overcome. It strikes Port Neuf river near where it cañons through the range of mountains skirting the Bear river valley on the west, then follows the Port Neuf valley, and enters Snake river plains about latitude $42^{\circ} 45'$, and longitude $112^{\circ} 30'$. The only difficult work on this line is at Hodges's Pass, through the rim of the basin, where a tunnel of 1,600 feet will be required to obtain a 60 foot maximum grade, or a 90 foot grade will overcome the summit, avoiding the tunnel, but giving heavy work. I submit a profile of the line from the mouth of Ham's Fork to Port Neuf Gap. The balance of the distance to Snake river will be light work, and no grade to exceed 50 feet per mile, with good alignment. The distance by this approach from Ham's Fork to the mouth of Raft river, in Snake river valley, a point common to all the lines, is 225 miles; from Missouri river to Raft river, 1,110 miles; and from Omaha to the navigable waters of the Columbia, at the mouth of the Umatilla, by this route, is 1,515 miles; to Portland, 1,670 miles. The advantage of this route is, that it is 80 miles shorter from Omaha than any other approach. It avoids entirely the heavy grades crossing the Wasatch mountains, and to reach the navigable waters of the Pacific we would have only 400 miles of road to build, with the U. P. R. R. completed so far west, in 1868, that the track could be immediately laid on this route.

Very little rock-work would be encountered on this approach. It runs the greater part of the way through valleys or over table-lands suitable for cultivation, and capable of supporting a heavy population. Ham's and Bear river valleys are wide and rich, and skirt beautiful mountain streams, abounding with fish, and affording immense water power. Every acre of them could be cultivated. Vegetables and the smaller grains may be raised in abundance. The timber in the mountains adjacent to the valleys is heavy, and in unlimited quantities, pine, spruce, quaking ash, and hemlock predominating. Along Bear river, coal, of the brown formation, exists in heavy veins, and an analysis of it shows it to be some of the best coal existing west of the Missouri river. It is easy of access, has solid roof, and will be mined cheaply.

The line would pass near the Mormon settlements at Bear river and Soda Springs. Snow in Bear river valley lies steadily on the ground during the winter; but no enormous drifts would be encountered, as we avoid the heavy snows of the Wasatch Mountains. A line by this route, with the proper financial backing, could be built at the rate of 300 miles or more in a year, depending entirely upon the U. P. R. R. to bring forward to it iron; for the superstructure, ties, timber, lumber, &c., abound and can be furnished along the line.

A line secondary to this, that would point more directly to the Montana branch, could leave this line at Soda Springs, avoiding Port Neuf cañon, bear due north until it reaches the southerly bend of Blackfoot river, following the valley of this river to Snake river plains; then due west, or, crossing Snake river, strike directly west towards Fort Boise. From Soda Springs to Snake river would be light work, light grade, and good alignment, and take us into well watered valleys, skirted by mountains of pine—as beautiful a country as I ever saw. A reconnoissance made of the Blackfoot valley shows that a very direct line could be obtained down it, the valley it follows being from 8 to 10 miles wide. The advantages of this line would consist in encountering less snow than upon the Port Neuf Gap line, and in the shortening of the branch to Montana, which would strike off near Fort Hall, on Snake river.

Both of the above routes could be shortened in distance by striking off from the main line where it crosses Bear river, on line marked "B," thus avoiding the tunnel and heavy work, crossing the rim of the basin at Hodges's Pass. The length of the branch would be the same as "A" line, but the total distance from the Missouri river to Portland would be increased 60 miles, it leaving the main line that much farther west, and we should have to use the heavy grades on the main line, east of Bear river, that we encounter in overcoming the rim of the basin.

Second. The approach from Salt Lake City, or the mouth of Weber cañon, to Snake river, (line "C" on map,) avoid-

ing the crossing of the rim of the basin, would skirt the east shore of Great Salt Lake to Bear river, and follow the valley of Bear river to one of the streams leading to Marsh valley, and then to Snake river plains, or continue up the valley of the Bear river to Port Neuf gap. This line would be expensive, but of easy grade. It would accommodate all the settlements along the east shore of Great Salt Lake, Cache valley, and Bear river valley. Its general direction would be almost due north, part of the way east of north, and it would increase the distance of the line from the Missouri river to Raft river, the common point in Bear river valley, 75 miles.

Third. The third approach, on the supposition that the road should be built south of Great Salt Lake, would be from Salt Lake City, or Weber cañon, along the east shore of Great Salt Lake, crossing one arm of the lake, (Bear River bay,) near Mud island; thence along the west base of Promontory Point to Pilot Springs; thence down Clear creek, or Raft river valley, to Snake river. The crossing of Salt lake would be in water from one to ten feet deep, and about 3 miles long. The line could be carried still further north, and cross Promontory Point some 18 or 20 miles north of its southern extremity, which would require some very heavy work and about 6 miles of 75 feet grades. After leaving the settlements of Salt Lake, and until it reaches Raft river, the line skirts a country uninviting and hardly susceptible of cultivation, but avoids the desert. There would be plenty of water and timber along the route, with all the material necessary to build the road. Coal is said to exist in Raft River mountains, but this fact has not been fully established. The rim of the basin, on Raft river range, could be crossed with 70 feet grades, and comparatively light work, but heavy snows in winter would be encountered. The distance of the branch to the mouth of Raft river, by the line marked "D" on the map, would be 60 miles, and 1,165 miles from Omaha to the mouth of Raft river; the branch marked "D" would be 150 miles from the mouth of Weber cañon to Raft river, making the branch shorter than "A" line by 75 miles; but

the entire length of the road to travel, from the Missouri river to the mouth of Raft river, would be 55 miles greater.

Should the main line of the U. P. R. R. run north of Great Salt Lake City, which is more than probable, the branch would leave the main line at the north point of Great Salt Lake, strike due north to Pilot Springs, then down Raft river valley to the mouth of Raft river, and would be only 60 miles long, and is the shortest branch that can be built, giving the same distance from the Missouri river as the last route. The work on this line would be light, but the grades heavy, the eastern rim of the basin being avoided by the branch, but crossed by the main line, and the northern rim to overcome. Heavy snows would be encountered from Promontory Point to Snake river valley, which lie, in winter, three feet on the level, with the usual drifts of this high altitude. After the main line reaches Great Salt Lake, this line could be built as fast as line "A," but track-laying would not be commenced from the east until the main road was running to the mouth of Weber cañon or the north point of the lake.

THE MAIN LINE FROM THE MOUTH OF RAFT RIVER TO PORTLAND (OREGON) AND PUGET'S SOUND.

The valley of Snake river is a wide plain, volcanic in formation, the river often cañoning through immense gorges and over high, perpendicular falls. The plains are wide, reaching some 100 miles at the widest point. The mountains do not approach the river until the mouth of the Malade river or King's mountain is reached, on the east side, and Burnt river on the west, and a line could be laid all the way on either side of the river; but probably a better and cheaper line could be obtained by crossing the Snake to the north side, and then crossing back again. Steamboats run up Snake river to Lewiston regularly, and 75 miles above occasionally, and from Old's Ferry to Salmon Falls, leaving a portage of 75 miles only by the valley line. The line would follow the valley of Snake river, or over Snake river plains,

to Burnt river. This plain is so wide and the country so uniform, that nothing but an instrumental survey could determine the exact location of the line; but no great difficulty would have to be overcome on any of the numerous lines down Snake river that have been discussed by the citizens of Idaho and Oregon. From the mouth of Burnt river to the Columbia, crossing the Blue mountains, is the difficult portion of the route. The Blue mountains are high in altitude, rugged, and the distance to overcome them is short, but the pass at the head of the Grande Ronde is said to be the lowest in the range. The route indicated now as most practicable is up Burnt river, crossing to Powder, following its tributaries to a low pass leading into the waters of John Day's river, and following that valley to the Columbia, or crossing from Powder river valley to the Grand Ronde, and up it or its tributaries to the pass, and then down the tributaries of the Umatilla or Walla-Walla to the Columbia. Nothing but a thorough and careful instrumental examination of this country could determine the proper line. However, I am satisfied, from the profile and formation of the country, that a line can be obtained over this range of mountains with grades not to exceed 80 feet per mile, and with work that will not be difficult or very expensive. After reaching the Columbia, that valley would be followed to Portland. On striking the Columbia at Umatilla, or at the mouth of the Umatilla or the Walla-Walla, the navigable waters of the Pacific are virtually reached, and the road down the Columbia could be pushed just as fast as desired, as it could be used and worked upon at as many points as its early completion required. Charters for roads up this valley now exist, and short railroads around the Dalles and Cascades have already been built. The local business of Oregon and Idaho would support the road to-day. No such difficulties in obtaining material, labor, or transportation would have to be encountered on this line as we have had to overcome in building the Union Pacific Railroad.

From Portland, or Fort Vancouver, to Puget's Sound, the work and grades are light and the alignment good, with no

mountain ranges to overcome. A line would follow the general direction of Cowlitz valley, and make its terminus on Puget's Sound, at Olympia, or push farther north to Steilacoom. There is no difficulty which cannot be overcome on this portion of the route. The road could be built at any time, or at such time as the branch was building, as all material for constructing this part of the road (except iron for superstructure and equipment, which could be taken around by sea) is to be found in abundance along the coast.

LINE TO MONTANA.

The line to Montana would leave the Oregon line in Snake river valley or Soda Springs, following up Snake River valley, passing the main Rocky Mountain range at the head of one of the streams leading to the waters of the Jefferson Fork of the Missouri. Two hundred miles would bring us right into the heart of this Territory, and the line, after crossing the main range of the Rocky Mountains, would take the direction that the interests of the Territory demanded. It would develop the valley of the Jefferson and Madison, and accommodate all portions of the mining regions of that rich Territory.

In work, grades, and alignment, the route is feasible, and could be run at all seasons of the year. Snow on this route never has obstructed travel, and the passes over the Rocky Mountains, in this latitude, do not reach an elevation of 6,500 feet above the level of the sea, while the general elevation of Snake river valley is from 4,500 to 6,000 feet above the sea, giving but little elevation to overcome, with good valleys and plenty of distance to overcome it in.

The fact being determined beyond a doubt, that there is not only a feasible but a remarkably favorable route from the U. P. R. R. to Idaho, Montana, and Portland, the questions arise: What are its advantages over all others? What are the inducements to build it? And in what time can it be built?

1st. Its advantages. By commencing to build in the

spring of 1869, the fall of 1870 would give Montana, Idaho, Oregon, and Washington Territories, a direct through railroad communication with all points east; whereas, by the route they have been looking to for railroad communication—the Northern Pacific—they will have to wait years, and until 1,700 miles are built, while we would only have 300 miles to build.

2d. It strikes the Pacific ocean at Portland; also at Puget's Sound. This inland sea includes the whole body of water flowing into the Pacific at the Straits of San Juan de Fuca, and surpasses the Mediterranean in the safety of its navigation and the security and anchorage of its harbors. For all the China, Japan, and India trade, coming down the Pacific coast, it would save the water transportation for the entire length of coast line from the Straits of San Juan de Fuca to San Francisco, as all ships coming from China, India, &c., make our coast near the mouth of these Straits.

3d. We open up communication with all that vast country enclosed by the Rocky Mountains on the east and north, by the Cascades on the west, and by the rim of the Great Basin on the south, which abounds in fine streams, valleys, timber, and all the precious metals of the world. I am inclined to believe that eastern Oregon, as soon as this road is built, will exceed, in its products, western Oregon; and when you furnish the means and inducements that this road will give, and hold out to settlers the advantages of the country I have described, no one can now estimate the trade, traffic, and wealth which that now uninhabited, vast inland territory will develop. I am told that to-day the little valley of the Walla-Walla produces for shipment by the Oregon Steam Transportation Company's boats more produce and grain than they are able to transport. It gives Oregon and Washington Territory an all rail communication with the Atlantic. It reaches the Pacific without having to overcome any grade to exceed 90 feet, and avoids the Wasatch and Sierra Nevada ranges, with their troublesome snows and inhospitable winters.

4th. It accommodates Montana, Idaho, Washington, and

Oregon with a railroad several years sooner than can be obtained by any other line from the east. In connection with the navigation of the Snake and Columbia rivers as temporary aids or auxiliaries, it gives that people a communication with the U. P. R. R. by the building of only 285 miles of railroad, whereas, by coming from the east, they must build from 1,700 to 2,000 miles, through an uninhabited, inhospitable, mountainous, broken country, portions of which are held to-day by hostile Indians, portions of it impassable in winter, in consequence of deep snows, and no portion of it having even the great advantage the U. P. R. R. had while building, of being near the great line of overland travel indicated by nature in the formation of the country, adopted by the instinct of the buffalo, followed closely by the savage, who now has been forced away from it by the advance of civilization. This branch has one great commercial and local advantage—it not only accommodates Montana, Idaho, Oregon, and Washington, but the whole northwest coast is benefited, and no one portion at the expense of the other. It holds the trade, commerce, and traffic of that country in its natural channel, and as it is built, mile by mile, every foot can be used in connection with the existing lines of water communication now established there.

Finally, with the proper financial support, I undertake to say that our company can build a road from our line to the navigable waters of the Columbia in eighteen months from the 1st of January, 1869; or, if necessary, we would commence building, with the proper financial aid, from the Columbia east, and finish the work in two years from January 1, 1868.

It seems to me, with a route that nature has intended for a railroad to the Pacific, near our northern boundary, that the people of all that vast territory should abandon all other projects and concentrate all their energies upon obtaining an outlet east, through a country a great portion of the way susceptible of cultivation, and nearly all the way abounding in precious minerals, with an entire length to the Missouri river not to exceed 1,670 miles, with only an all-rail branch

to build of 785 miles, and only 285 miles, using the navigation of the Columbia and Snake rivers, rather than to build the great distance and encounter the great obstacles they would have to overcome on a route due east. The time may come when the country will demand the building of the Northern Pacific; but to-day all it assumes to accomplish for the country west of the Rocky Mountains, all the advantages to be derived from building it, can be obtained in building the Idaho, Montana, Oregon, and Washington branches to the Union Pacific.

It is not a fiction, the great vision of Columbus; it is a fact, that we will soon have the means of directing a large portion of the trade of Asia across the continent of America. We will leave the Pacific Ocean at Puget's Sound or Portland and San Francisco, and reach the great inland channel of trade and travel across the continent, the *Union Pacific Railroad*, and be only five days from the principal ports of the Atlantic. The great saving of time and insurance, with quick returns upon capital invested, will overcome the extra cost of freight, and, as a passenger route, no one doubts its general advantages—it virtually annihilates time.

I herewith submit a map of the country, showing the routes discussed in the report.

I am, very respectfully,

Your obedient servant,

G. M. DODGE,
Chief Engineer.

DISTANCES.

Water and Railroad Branch.

Mouth of Ham's Fork to Salmon Falls, all rail,	285 miles.
Salmon Falls to Olds's Ferry, by Snake river,	
steamboat,	150 "
Olds's Ferry to mouth of Umatilla, railroad, .	175 "
Mouth of Umatilla to Portland, <i>via</i> Columbia	
river, steamboat,	165 "
Total railroad,	460 "
Total steamboat,	315 "

ALL RAILROAD—MAIN LINE AND BRANCHES.

Line A.

U. P. R. R. line, mouth of Ham's Fork to Raft	
river,	225 miles.
Missouri river to Raft river,	1,110 "
Missouri river to Columbia river, at mouth of	
Umatilla,	1,515 "
Missouri river to Portland, Oregon,	1,670 "
Missouri river to Puget's Sound,	1,820 "

Number of miles of railroad to build on line "A" to connect U. P. R. R. with Portland, using the navigable waters of Snake and Columbia rivers, 285.

Line D.

Missouri river to mouth of Weber cañon,	1,015 miles.
Weber cañon to north point of Salt Lake,	90 "
North point of Salt Lake to Raft river,	60 "
From mouth of Raft river to navigable waters	
of Columbia, at mouth of Walla-Walla,	400 "
Mouth of Walla-Walla to Portland,	185 "
Total distance from Missouri river to Portland,	
"D" line,	1,750 "

Number of miles of branch railroads to build on this line to connect with Portland, using the navigable waters of Columbia and Snake rivers, 285.









